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cont.

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8 A brush assembly according to claim 7, in which the
brush bodies are the same size but made of different density
material.

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REMARKS

Applicant responds herein to the Office Action dated August 13, 1991.

A Petition for Extension of Time (two months) and the fee therefor are enclosed.

Turning to the top of page 2 of the Office Action, the specification has been amended to include a new title. It is believed that the new title is sufficiently descriptive of the instant invention. However, applicant would be pleased to accept another title, if suggested by the Examiner.

In response to the objection to the specification and the rejection of claims 1-6 under 35 U.S.C. 112, first paragraph, the specification and drawings have been amended responsive to the points raised in the Office Action. Further, proposed Fig. 3A has been added herein, to show arms/brush-bodies of different sizes (claim 5). In main claim 7 (replacing claim 1), the rejection predicated on the use of "two or more . . . brush bodies" has been avoided.

Relative to the Examiner's question as to how the terminal part is secured to the brushes leaves, the Examiner's attention is respectfully directed to the first full paragraph on page 4 of the specification which refers to rivets 22 or 23 and also to "clip fixing".

Accordingly, the Examiner is respectfully requested to reconsider and rescind the rejection under 35 U.S.C. 112, first paragraph.

Substantively, claims 1 and 2 stand rejected under 35 U.S.C. 102(a) and/or (b) as being anticipated by Campbell or Hammer. Further, claims 3-6 stand rejected under 35 U.S.C. 103 as being unpatentable over the aforementioned Campbell or Hammer references. Reconsideration of these rejections is requested in

view of the amendments to the claims herein and the following remarks.

The present invention is directed specifically to brush assemblies in which the brushes are supported/constructed to have different natural frequencies of oscillation. This can be achieved by changing the resilience or shape of the support arms and/or by using brushes of different sizes or densities--all of which is described and fully supported at page 4, line 23 to page 5, line 16 and elsewhere in the specification. The instant invention compensates, reduces, or even totally eliminates problems emanating from different modes of vibration which a motor might experience.

The applicant also set out to reduce the brush effective interface resistance, which is realized with the dual brushes. See the discussion on page 5, line 17 through page 6, line 8. This was achieved basically by providing two brushes electrically in parallel.

Turning to the references, it is noted that in Hammer blade contacts are used which are not "separately formed" brush bodies as defined in the claims of this application. Nothing in Campbell or Hammer suggests to modify its teachings to arrive at the construction of the present invention. It is here noted that both of these reference address different problems than that which is addressed in the present application. Both references focus on the problem of mechanical friction and wear on the brush.

That these references might also because of their U-shaped construction reduce brush/commutator interface resistance is at best a matter of accident and incidental to the basic teachings of these references. Further, and more importantly, there is no hint in either citation regarding compensating for or eliminating the problem associated with vibrations, as by providing resiliently mounted brushes of different natural frequencies. Vibrations are especially prevalent in applications such as here involving brush contact against the periphery of a rotor, as rotors are rarely perfectly round, especially after

some use. It is significant that the present invention has identified and solved this problem.

There is no suggestion in the citations that two similar resilient brush assemblies may be formed with different natural frequencies of oscillation. True enough, with the help of the hindsight provided by the instant disclosure, it appears simple to arrange otherwise similar brush supports to have different natural frequencies of oscillation. Once done, there is no inherent rotational rotor speed at which the assemblies might simultaneously exhibit poor electrical contact. A real practical problem is conveniently and easily taken care of. But the citations do not teach or suggest either the problem or its solution. The apparent convenience and simplicity results from examining this invention with the benefit of hindsight and not from the disclosure of the prior art.

Accordingly, it is respectfully submitted that the main claim in the application (claim 7) definitively distinguishes over the cited references and accordingly the Examiner is respectfully requested to reconsider and rescind the rejection of the same over the art of record. The remaining claims in the application contain all of the limitations of claim 7 and impose further limitations thereon. As such they are even further distanced from the prior art and patentable on their own merits.

Accordingly, the Examiner is respectfully requested to reconsider the application, allow the claims, as amended, and pass this case to issue.

In compliance with the duty to disclose pursuant to 37 C.F.R. § 1.56 and §§ 1.97-1.99, applicant encloses a PTO Form 1449 which lists and attaches several references which were cited in connection with a corresponding European application.

The references Great Britain No. 2203899 A and U.S. Patent No. 4,037,125 depict supporting means for brushes with general constructions similar to that of the present invention. However, none of the references discloses the key feature of the present invention which is predicated on the provision of a pair

of support arms, where each arm and its brush body have a different natural resonance frequency of oscillation.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231, on January 13, 1992:

Steven I. Weisburd

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January 13, 1992

Date of Signature

Respectfully submitted,

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